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20th Updated and Expanded Edition

by Harry Newton

CMPBooks

These signals will be understood only if the protocols used on each LAN are the same, e.g. XNS or TCP/IP, but they don't have to be the same for the bridge to do its job for the signals to move on either LAN. They just won't be understood. This differs from gateways and routers. Routers connect LANs with the same protocols but different hardware. The best examples are the file servers that accommodate different hardware LANs. Gateways connect two LANs with different protocols by translating between them, enabling them to talk to each other. The bridge does no translation. Bridges are best used to keep networks small by connecting many of them rather than making a large one. This reduces the traffic faced by individual computers and improves network performance.

Bridge Group Virtual LAN terminology for a group of switch interfaces assigned to a singular bridge unit and network interface. Each bridge group runs a separate Spanning Tree and is addressable using a unique IP address.

Bridge Lifter A device that removes, either electrically or physically, bridged telephone pairs. Relays, saturable inductors, and semiconductors are used as bridge lifters.

Bridge Protocol Data Unit BPDU. The implementation of the spanning tree protocol (STP) and rapid spanning tree protocol (RSTP) protocols allows network devices to detect and block links that could cause logical loops within a network and to manage redundant links to maintain network integrity in the event of a link failure. Bridges and switches that use the spanning tree protocol (STP) or the rapid spanning tree protocol (RSTP) use the bridge protocol data unit (BPDU) to communicate with each other and exchange information. The BPDU is a datagram that has a specific format to relay the following information about the switch that transmits it:

- Media Access Control (MAC) addresses (switch and port)
- Switch priority
- Port priority
- Port cost
- Root switch identifier
- Root port and designated port identifiers
- Path cost from port to root switch
- Spanning tree enabled devices gather the BPDUs from other devices on the network and use the information to make configuration decisions such as the election of a root device, the election of a designated switch to become a link between a subnet and the root device, the designation of root and designated ports that are used to communicate STP and RSTP information, the shortest best path between a device and the root switch, and finally the detection and removal of loops in the network.

When a change occurs in a network topology BPDUs are resent between the network devices to determine if a reconfiguration is required. For instance, if the root switch fails, BPDUs can be resent to figure out a new root switch. Also if a link between network devices fails, a previously blocked redundant link can be opened to maintain network communication. The exchange of BPDUs makes configuration and reconfiguration of the spanning tree topology possible, however, STP and RSTP BPDUs are not the same. RSTP BPDUs are optimized for quicker configuration of the network and are therefore different than traditional STP BPDUs. Steps have been taken though to ensure the compatibility between the two standards such that data exchanged between STP and RSTP devices is unhindered.

Bridge Static Filtering The process in which a bridge maintains a filtering database consisting of static entries. Each static entry equates a MAC destination address with a port that can receive frames with this MAC destination address and a set of ports on which the frames can be transmitted. Defined in the IEEE 802.1 standard. See also IEEE 802.1.

Bridge Tap An undetermined length of wire attached between the normal endpoints of a circuit that introduces unwanted impedance imbalances for data transmission. Also called bridging trap or bridged tap. See Bridged Tap.

Bridged Jack A dual position modular female jack where all pins of one jack are permanently bridged to the other jack in the same order.

Bridged Ringing A system where ringers on a phone line are connected across that line.

Bridged Tap A bridged tap is multiple appearances of the same cable pair at several distribution points. A bridged tap is any section of a cable pair not on the direct electrical path between the central office and the user's offices. A bridged tap increases the electrical loss on the pair — because a signal traveling down the pair will split its signal between the bridges and the main pair. Since most existing telephone company cable pair is bridged, the phone company puts loading coils in the circuit. The effect of load coils is to modify the loss versus frequency response of the pair so it is nearly constant across the voice band. This works for voice. However the loss above the voice band due to load coils increases rapidly. ISDN, T-1, DSL and other digital circuits operates above the voice band. So, when the phone company installs digital circuits, it must remove the load coils. See Bridge and Loading Coil.

Bridger Bridger Amplifier. An amplifier which is connected directly into the main trunk of a CATV system, providing isolation between the main trunk and multiple (high level) outputs.

Bridging Bridging across a circuit is done by placing one test lead from a test set or a conductor from another circuit and placing it on one conductor of another circuit. And then doing the same thing to the second conductor. You bridge across a circuit to test the circuit by listening in on it, by dialing on it, by running tests on the line, etc. You can bridge across a circuit by going across the pair in wire, by stripping it, etc. You can bridge across a pair (also called a circuit path) by installing external devices across quick clips on a connecting block.

Bridging Adapter A box containing several male and female electrical connectors that allows various phones and accessories to be connected to one cable. Bridging adapters work well with 1A2 key systems and single line phones, but usually not with electronic or digital key systems and electronic or digital telephones behind PBXs.

Bridging Clip A small piece of metal with a U-shape cross-section which is used to connect adjacent terminals on 66-type connecting blocks.

Bridging Connection A parallel connection by means of which some of the signal energy in a circuit may be extracted, usually with negligible effect on the normal operation of the circuit. Most modern phone systems don't encourage bridging connections, since the negligible is rarely negligible.

Bridging Loss The loss at a given frequency resulting from connecting an impedance across a transmission line. Expressed as the ratio (in decibels) of the signal power delivered to that part of the system following the bridging point before bridging, to the signal power delivered to that same part after the bridging.

Bridle Cards Proprietary Basic Rate ISDN Dual Loop Extension that lets ISDN service be provided up to 28,000 feet away. See ISDN.

BRIDS Bellcore Rating Input Database System.

Briefcase A Windows 95 feature that allows you to keep multiple versions of a file in different computers in sync with each other.

Brightness An attribute of visual reception in which a source appears to emit more or less light. Since the eye is not equally sensitive to all colors, brightness cannot be a quantitative term.

BRISC Bell-Northern Research Reduced Instruction Set Computing.

Brite Cards And Services Basic Rate Interface Transmission Extension lets telephone companies extend service from ISDN-equipped central offices to conventional central offices. See ISDN.

British Telecommunications Act In 1981 in the U.K. this act separated telecommunications from the post office and created British Telecommunications (BT). See also Post Office Act.

Brittle Easily broken without much stretching.

Broadband Today's common definition of broadband is any circuit significantly faster than a dial-up phone line. That tends to be a cable modem circuit from your friendly local cable TV provider, a DSL circuit, a T-1 or an E-1 circuit from your friendly local phone company. In short, the term "broadband" can mean anything you want it to be so long as it's "fast." In short, broadband is now more a marketing than a technical term. See also the definitions following.

Broadband Amplifier An amplifier with a relatively wide frequency response as distinguished from a single channel or narrower band amplifier.

Broadband Bearer Capability A bearer class field that is part of the initial address message.

Broadband Integrated Services Digital Network B-ISDN.

Broadband Inter-Carrier Interface BICI. A carrier-to-carrier interface line PNNI (private network-to-network interface) that is needed because carriers do not permit their switches to share routing information or detailed network maps with their competition's equipment. NOTE: BICI supports permanent virtual circuits between carriers; however, the ATM Forum is currently addressing switched virtual circuits.

Broadband Loop Emulation Services See BLES.

Broadband Multimedia Broadband multimedia is the present obsession of Terry Matthews, the only man in Canada who founded two companies to reach annual sales of over $1 billion. He is now working on his third, called March Networks, which

focuses on broadband multimedia. Terry's obsession in a nutshell:

- As we wire the world for broadband communications and as the cost drops dramatically (a factor of a hundredfold over the past five years), we open the world to an entire new range of new telecommunications opportunities — those involving video, voice and data combined as a viewable, storable, retrievable record. Visiting patients electronically makes for happier nurses, happier, longer living patients. Ditto for online, broadband education. Shrinkage (i.e. stealing) is a $32 billion "industry" in the U.S. Cut it by 10% with extensive video surveillance tied to cash register transactions and you'll increase retail store net income by 18%. In the utility industry (pipelines, electricity, oil, etc.) security and operations managers must manage hundreds of remote installations, mitigating threats to reliable power delivery. Centralizing video and data records from remote sites allows utilities to collect valuable multimedia (graphic and useful) information that can significantly lower operations cost. Such applications include verification of alarms reported by SCADA (Supervisory Control And Data Acquisition) systems, visual equipment inspection, remote project management and monitoring of conditions at dams, rivers and other electricity generating sites.
- The telecommunications industry is about to enter a new era — selling speciality multimedia vertical industry applications. This contrasts with what we do today. We sell horizontal applications. This means that the industry's services are the same for every customer. Every customer buys bandwidth in various widths. And because my bandwidth is indistinguishable from your bandwidth, our major method of competing as telecom carriers has been to cut prices. No more.
- Selling these new broadband multimedia applications will help chew up the excess bandwidth carriers installed in recent years.
- Selling these applications as applications, not as bandwidth, will significantly boost profits.
- Selling these new applications as applications is akin to selling additional channels of television programming on one common pipe — the coaxial cable which your CATV brings to your house.

Broadband Personal Communications Standards BPCS. Consists of 120 MHz of new spectrum available for new cellular networks. Also known as wideband PCS.

Broadband Switching System See BSS.

Broadband Wireless Local Loop B-WLL is also known as local multi-point distribution service, i.e. LMDS. B-WLL is a way of getting various multimedia services such as high-speed Internet, cable TV, and VOD (video-on-demand) to subscribers. The great advantage of B-WLL is that wireless technology can be used to connect the costly last mile of high data speed networks from an operator's backbone network to individual users. The technology uses millimeter wave signals in the 28 GHz spectrum to transmit voice, video, and data signals within a three-mile to 10-mile radius.

LMDS differs from an ordinary transport system in the way a train differs from a pipeline. Both are data transport systems, but a pipeline can transport only one product from one place to another. A train, on the other hand, can transport many different products over the same infrastructure. LMDS, implemented with multi-service protocol such as ATM, can transport, among others, voice, Internet, Ethernet, video, computer files, and transaction data. It is the multipoint radio technology, combined with the appropriate protocol and access method that gives LMDS its potential tremendous potential. LMDS/B-WLL infrastructure technology can be divided into two basic multiple access technologies: FDD and TDD. FDD equipment uses separate frequencies for the up-link and down-link channels, as opposed to TDD, which uses the same frequency channel for both up-link and down-link, separating the traffic by the use of time slots. FDD equipment differs among vendors in the type of backbone network technology incorporated into the system. The two primary divisions are cable-modem-based versus telecom-network-based. With respect to the telecom-backbone-based solutions, there are two basic architectures being developed: time division multiplex (TDM) and packet-based (either ATM or IP). B-WLL has some advantages: (1) It can be engineered to provide 99.99% availability, rivaling that of the best fiber backbones. (2) It can be deployed quickly. Once a hub is installed (a matter of days), new customers can be added in a matter of hours. (3) It is estimated that deployment of a B-WLL system is about 60% cheaper than fiber-optic cable-based networks. Physical technologies such as copper or fiber require individual rights-of-way to each building, as well as the physical placement of the transport media. (4) Wireless equipment is less vulnerable to sabotage, theft, or damage resulting from exposure to the elements. There are negatives. (1) It requires line-of-sight. You typically can't shoot it through buildings or hills. (2) Bad weather can affect it.

Broadcast 1. To send information to two or more receiving devices simultaneously — over a data communications network, voice mail, electronic mail system, local TV/radio station or satellite system. Broadcast involves sending a transmission simultaneously to all members of a group. In the context of an intelligent communications network, such devices could be host computers, routers, workstations, voice mail systems, or just about anything else. In the less intelligent world of "broadcast media," a local TV or radio station might use a terrestrial antenna or a satellite system to transmit information from a single source to any TV set or radio capable of receiving the signal within the area of coverage. See also Narrowcasting and Pointcasting. Contrast with Unicast, Anycast and Multicast.

2. As the term applies to cable television, broadcasting is the process of transmitting a signal over a broadcast station pursuant to Parts 73 and 74 of the FCC rules. This definition is deliberately restrictive: it does not include satellite transmission, and it does not include point-to-multipoint transmission over a wired or fiber network. In spite of the fact that the broadcast industry and the cable television industry are forever bound together in a symbiotic relationship, they are frequently at odds over policy issues. See Broadcast Station. Compare with Cablecast.

Broadcast Channel BCCH. A wireless term for the logical channel used in certain cellular networks to broadcast signaling and control information to all cellular phones. BCCH is a logical channel of the FDCCH (Forward Digital Control CHannel), defined by IS-136 for use in digital cellular networks employing TDMA (Time Division Multiple Access). The BCCH comprises the E-BCCH, F-BCCH and S-BCCH. The E-BCCH (Extended-BCCH) contains information which is not of high priority, such as the identification of neighboring cell sites. The F-BCCH (Fast-BCCH) contains critical information which must be transmitted immediately; examples include system information and registration parameters. S-BCCH (System message-BCCH), which has not yet been fully defined, will contain messages for system broadcast. See also IS-136 and TDMA.

Broadcast Domain Set of all devices that receive broadcast frames originating from any device within the set. Broadcast domains typically are bounded by routers because routers do not forward broadcast frames.

Broadcast List A list of two or more system users to whom messages are sent simultaneously. Master Broadcast Lists are shared by all system users and are set up by the System Administrator. Personal Lists are set up by individual subscribers.

Broadcast Message A message from one user sent to all users. Just like a TV station signal. On LANs, all workstations and devices receive the message. Broadcast messages are used for many reasons, including acknowledging receipt of information and locating certain devices. On voice mail systems, broadcast messages are important announcement messages from the system administrator that provide information and instructions regarding the voice processing system. Broadcast messages play before standard Voice Mail or Automated Attendant messages.

Broadcast Net A British Telecom turret feature that allows each trader single key access to a group of outgoing lines. This is designed primarily for sending short messages to multiple destinations. The "net" function allows the user to set up and amend his broadcast group.

Broadcast Quality A specific term applied to pickup tubes of any type — vidicon, plumbicon, etc. — which are without flaws and meet broadcast standards. Also an ambiguous term for equipment and programming that meets the highest technical standards of the TV industry, such as high-band recorders.

Broadcast Station An over-the-air radio or television station licensed by the FCC pursuant to Parts 73 or 74 of the FCC Rules, or an equivalent foreign (Canadian or Mexican) station. Cable television systems are authorized by FCC rules to retransmit broadcast stations; however, such retransmission is subject to a number of restrictions:

- The cable television operator is liable for copyright royalty fees collected by the Copyright Office.
- Under certain conditions, certain broadcast stations are eligible for mandatory carriage.
- Under certain conditions, the cable operator must obtain the permission of the licensee of the broadcast station. This term includes satellite-delivered broadcast "superstations" such as WGN-TV and WWOR, but it does not include:
- Satellite-delivered non-broadcast programming services (HBO, ESPN, C-SPAN, QVC, etc.).

level languages translate human instructions into the machine language computers can understand, but which humans don't have to (in order to tell the computer what to do). Computer languages such as Basic, FORTRAN, COBOL and Pascal are high level languages. They are a number of levels (at a High Level) away from the actual bit manipulation machine language, also called "bit twiddling" by the Hackers). Compare with Low Level.

High Level Modulation Modulation at the last amplifier stage of a transmitter.

High Low Tariff A tariff in which two prices are given for something — a high price and a low price. The first high/low tariff from AT&T was for leased voice lines where a lower charge was made per mile for connections between routes that have much traffic (High Density) and greater charges per mile are made for all other (Low Density) routes. The High/Low tariff was significant because it was AT&T's response to competition from long distance carriers like MCI and it was one of the first moves away from nationwide rate averaging, which was the way things were done under monopoly.

High Memory Area HMA. High Memory Area is the first 64KB of extended memory. If you're using MS-DOS 5.0 or 6.0, you can save some conventional memory (i.e. below 640K memory) by loading the operating system into HMA. Add the line DOS=HIGH to your CONFIG.SYS to use HMA for the operating system.

High Order Bit Hobbit. Also known as a an "alt bit," high bit," and "meta bit." The most significant bit of a byte, a high-order bit generally is the first bit in a byte. Since the hobbit is the first bit in a byte, it is the first bit that a device sees, and therefore the first bit on which action is taken. The high-order bit can be used for a wide variety of purposes in a data communications environment, all of which identify to the receiving device something of significance relative to the handling of the associated data. For example, the hobbit in the header of a packet can be used by a device to indicate the priority level of the packet data packet transfer. The hobbit also can be used to indicate the highest level of addressing, in order that the network can route the data properly.

High Pass Filter A filter which passes frequencies above a certain frequency and stops (attenuates) those below.

High Performance Computing Act An Act passed by Congress in 1991 to foster the creation of computer "superhighways" linking computers at universities, national laboratories and industrial organizations. One objective of the High Performance Computing Program is the establishment of a gigabit/second National Research and Education Network (NREN) that will link the government, industrial and higher education communities involved in general research activities. Such a gigabit network would provide a significant increase in bandwidth compared with the existing National Science Foundation network, which is evolving from a 1.5 megabit per second (T-1) backbone to 45 megabit per second (T-3).

High Performance Computing and Communications See HPCC.

High Performance Parallel Interface HIPPI. A high-speed multi- signal interface analogous to an RS-232 interface but for high-speed computers, etc. HIPPI provides 800 (or1600) Mb/s interconnections using 32 (or 64) bit wide parallel data paths for distances up to 25 meters (or longer if use fiber). Standardization activity is in ANSI X3T9.3.

High Performance Routing HPR. A local area networking term. HPR is the next-generation APPN — referred to in the past as APPN+ — that adds IP-like dynamic networking — e.g. dynamic alternate routing in the event of path failure — features to APPN, and uses a routing mechanism that works at Layer 2 using a RIF concept similar to that found in SRB.

High Power Amplifier HPA. A device which provides the high power needed to boost signals 22,000 miles plus from an earth station to a satellite.

High Rejection The ability of a voice recognition system containing active vocabulary words to reject those sounds that do not match closely the words in its vocabulary.

High Resolution TV Television with over 1,000 lines per screen, about double the resolution of present systems. Sometimes called HDTV, for high-definition television. We're still awaiting standards for high resolution TV. See HDTV for a bigger explanation.

High Sierra Format A standard format for placing files and directories on CD-ROM, revised and adopted by the International Standards Organization as ISO 9660.

High Speed Digital Subscriber Loop See HDSL.

High Speed Local Network HSLN. A local network designed to provide high throughput between expensive, high-speed devices, such as mainframes and mass storage devices.

High Speed Printer Any printer which can print at over 100 lines a minute. Like many definitions, this one is arbitrary. Some people claim a dot matrix is "high speed" and a letter quality, daisy wheel is a "low speed" printer. Laser printers could be classed as high speed printers, maybe.

High Speed Register Set Registers are storage locations within the CPU that are used to hold both the data to be operated on and the instructions to accomplish the operations.

High Speed Signal An AT&T definition for a signal traveling at the DS-3 rate of 44.736 Mbps (million bits per second) or at either 90 Mbps or at 180 Mbps (Optical mode).

High Split 1. A broadband cable system in which the bandwidth used to send toward the head-end (reverse direction) is approximately 6 MHz to 180 MHz, and the bandwidth used to send away from head-end (forward direction) is approximately 200 MHz to 400 MHz. The guard band between the forward and reverse directions (180 MHz to 220 MHz) provides isolation from interference. High split requires a frequency translator which transfers the originating signals to other frequency ranges at the head-end, in either direction. Historically, CATV systems used the spectrum below Channel 2 for inbound transmissions from the user premise to the head-end; that frequency range is 5-30/40 MHz.

2. A term used in radio communications, including paging and cellular, for several ranges of frequency used to connect a remote site to a main site. For instance, the low-split might be 806.0125 MHz and the high-split 851.0125-869.9875 MHz. Frequency translators are used to transfer the signal to another frequency range from that point forward.

High Tech A high-falutin' (i.e. overly pretentious) way of saying technology. I exorcised the term out of this dictionary out of disgust.

High Tier A PCS cell phone service for users moving in a high-speed automobile. High-tier PCS systems are often straightforward evolutions of current digital cellular systems. In contrast, a low-tier is a PCS cell phone service for pedestrians or slow moving vehicles (no more than 30 to 40 mph). An evolution of cordless systems originally intended for in-building applications. Systems use small cells, so they can be designed with low-power transmitters and experience fewer handoffs than high-tier PCS systems (with high-speed, mobile users). Systems provide lower cost and higher-quality services, for low-speed users only.

High Usage Groups Trunk groups established between two central office switching machines to serve as the first choice path between the machines and thus, handle the bulk of the traffic. See High Usage Trunk Group.

High Usage Trunk Group A Bellcore definition. A trunk group that is designed to overflow a portion of its offered traffic to an alternate route.

High Water Mark A financial term. Let's say you give a money manager $100,000 of your money to manage. You agree to pay him 20% profit-sharing of all your gains. And you agree to do this annually. Let's say one year your manager loses 20% of your money. But the next year he earns 15%. He doesn't receive any profit-sharing of your 15% until he has earned back what he lost and is above the high water mark — the place you started. For a more formal definition, here's one from www.hedgeworks.com. High-water mark is an investor's capital basis in a given year used to determine the minimum value to which a manager's performance fee is measured. For example, a manager may only charge an investor a performance fee for any gains achieved over the investor's capital basis or the gains achieved since the last performance fee was charged.

Highway 1. Another word for BUS. A common path or set of paths over which many channels of information are transmitted. The channels of the highway are separated by some electrical technique.

2. The Information Superhighway. In 1995, a consulting firm called Ovum defined the superhighway as a mechanism for providing access to electronic information and content held on network servers. It has four key features, according to Ovum: A. It supports two way communications. B. It offers more than just simple voice telephony. C. It is interactive and provides real-time, cooperative communications, and D. It supports electronic screen-based applications.

Highway Construction Supervisor A consultant to provide assistance in specification, installation and/ or operation of systems and software for accessing the information highway.

Highway Patrol A slang term for the U.S. Congress.

Hijacking An attack on a computer system in which an established TCP/IP session is redirected in mid-session to an unauthorized host system.

HiperLAN/2 A high-speed standard for broadband wireless LAN applications approved by the ETSI in February 2000, consisting of three profiles for the corporate, pub-

H